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THE COMPOSITE THRIPS, MICROCEPHALOTHRIPS ABDOMINALIS (CRAWFORD).

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It is often more convenient to call an insect by its common name than by its scientific name. This doubtless is the case with *Microcephalothrips abdominalis* (Crawford). Watson (1923) first referred to this thrips as the "Compositae Thrips" and, in view of its decided preference for members of this plant family, it seems appropriate to adopt this common name.

The composite thrips was first described in 1910 by D. L. Crawford, now President of the University of Hawaii. Numerous females were taken at this time at Guadalajara, Mexico. Through the kindness of Dr. J. McDunnough the type slide, No. 328 of the Canadian National Collection, has been studied by the writer. On this slide are to be found eight specimens of *Microcephalothrips abdominalis* as well as two specimens of *Frankliniella moultoni* Hood, and no individual specimen is designated as the type. These specimens of *abdominalis* then become cotypes. *Thrips femoralis* Jones has been recognized as a synonym by several workers. The writer has been unable to locate and study the Jones type but, based on correspondence with P. R. Jones, believes the specimen to be in the Hood collection at Rochester, New York. The excellent description and illustration of Jones, however, enables one to definitely place *femoralis* in synonymy with *abdominalis*.

In 1923 Priesner described *Thrips microcephalus* and in correspondence (Dec. 7, 1936) states that he also has concluded it to be a synonym of Crawford's species. Girault (1926) published a very meager description of *Paraphysopus burnsi*. Also in the same year Moulton described *Thrips gillettei* and Karny *Stylothrips brevipalpis*, and Bagnall established the genus *Microcephalothrips* for *abdominalis* making it the type of the genus. Ramakrishna, and also Moulton, in 1928, pointed out that *Stylothrips* was synonymous with *Microcephalothrips* and that *S. brevipalpis* was very close to *M. abdominalis*. Moulton (1929) sunk his *gillettei* in favor of *abdominalis* Crawford. In 1934 Kelly and Mayne showed that *Paraphysopus burnsi* was synonymous with *S. brevipalpis*. Priesner writes (Dec. 7, 1936) that "between the Egyptian specimens of *Microcephalus* and those from the Dutch East Indies, (*Stylothrips brevipalpis* of Karny's collection) I cannot find find any specific difference."

The synonymy of M. abdominalis (Crawford) is as follows:

1910. *Thrips abdominalis* Crawford, Pomona Coll. Jour. Ent. 2:157-159, fig. 65.
1911. *Thrips abdominalis*, Moulton, U.S.D.A., Bur. Ent., Tech. Ser. 21, pp. 14, 23.
1912. *Thrips femoralis* Jones, U.S.D.A., Bur. Ent., Tech. Ser. 23, 1, pp. 4-5, Pl. 1, figs. 5-8, Jan.
1912. *Thrips abdominalis* (=*femoralis* Jones), Hood, Proc. Biol. Soc. Wash. 25:62, Apr.
1913. *Thrips abdominalis*, Morgan, Proc. U. S. Nat. Mus. 46:44, Aug.
1917. *Thrips abdominalis*, Hood. Insec. Inscit. Menstr. 5:60.
1918. *Thrips abdominalis*, Watson, Fla. Buggist, 1:66.
1923. *Thrips abdominalis*, Watson, Fla. Agr. Exp. Sta., Bull 168, pp. 43, 44.
1923. *Thrips microcephalus* Preisner, Entom. Mitt. 12:116-117, fig. 7 (p. 120).

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1925. *Stylothrips brevipalpis* Karny, Ramakrishna Aiyar, Journ. Bombay Nat. Hist. Soc. 30:871, Dec.
1926. *Paraphysopus burnsi* Girault, Insec. Inscit. Menstr. 14:188.
1926. *Microcephalothrips abdominalis*, Begnall, Ann. Mag. Nat. Hist. ser. 9, 18:98, 113-114, July.
1926. *Thrips* (*Ctenothripella*[1] Pr.) *gillettei* Moulton, Trans. Amer. Ent. Soc. 52:126-127, Pl. 6, figs. 14-17, July 22.
1926. *Stylothrips*[2] *brevipalpis* Karny, Mem. Dept. Agr. India, 9:206-208, fig. 10, Pl. 19, fig. 4, Sept.
1927. *Thrips* (*Microcephalothrips*) *microcephalus*, Priesner, Thysan. Europas, F. Wagner, Wien, pp. 344, 442-443.
1927. *Thrips* (*Microcephalothrips*) *gillettei*, Priesner, Thysan. Europas, p. 344.
1928. *Thrips* (*Ctenothripella* Pr.) *abdominalis*, Moulton, Proc. Haw. Ent. Soc. 7:110-111, 132, June.
1928. *Stylothrips brevipalpis*, Ramakrishna Ayyar, Mem. Dept. Agr. India. 10:226, fig. 19 (from Karny, 1926). Aug.
1928. *Thrips* (*Microcephalothrips*) *abdominalis*, Moulton, Annot. Zool. Japan, 11:305-306, 328, Dec. 20.
1929. *Thrips* (*Microcephalothrips*) *abdominalis* (=*T. gillettei* Moulton), Moulton, Bull. Brook. Ent. Soc. 24:236.
1930. *Microcephalothrips abdominalis*, Steinweden and Moulton, Proc. Nat. Hist. Soc. Fukien Christ. Univ. 3:9 (in separate).
1932. *Microcephalothrips abdominalis*, Esaki, Hori, etc., Iconogr. Insect. Japon., Tokyo.
1932. *Thrips* (*Microcephalothrips*) *microcephalus*, Hood, Bull. Soc. Roy. Ent. Egypt, 3:116.
1933. *Thrips* (*Microcephalothrips*) *abdominalis*, Newman, Andrewartha and O'Connor. Jour. Dept. Agr. W. Australia, 10, No. 3. pp. 361-373, Sept.[3]
1934. *Stylothrips brevipalpus* (=*Paraphysopus burnsi* Girault), Kelly and Mayne, Australian thrips, pp. 20-21.[3]
1934-35. *Microcephalothrips abdominalis*, Newman and Moulton, Jour. Roy, Soc. West. Australia, 21:95.
1936. *Thrips* (*Microcephalothrips*) *abdominalis*, Bailey, Pan-Pacif. Ent. 11:167.

It is sometimes the practice of thysanopterists to base species differentiation on the number of bristles on the longitudinal veins of the fore wing. When a long series of specimens comes to hand it becomes apparent that considerable variation often exists (Crawford, 1910, p. 158) in the number and arrangement of bristles on the wing veins. The reliability of this character then is questioned. For example, in *M. abdominalis* the bristles on the anterior longitudinal vein of the fore wing are arranged in groups. From the base to the tip of the wing there are, in the majority of cases, four groups in which there are 4, 3, 1, and 2 bristles respectively, those at the tip being widely separated (see fig. 1, B). This grouping is not constant even on both wings of the same specimen. Of the cotypes which are mounted so as to enable the bristles to be counted the bristles are in groups of 4-3-1-2 in all cases. In a large series examined the following variations were found:

4—3—1—2 in 62 cases
4—4—1—2 in 7 cases
4—3—0—2 in 3 cases
3—3—1—2 in 2 cases
4—3—1—3 in 1 case

The posterior longitudinal vein of the fore wing usually has six or seven evenly spaced bristles in the outer two-thirds. In the cotypes the number varies

[1]Priesner writes in a letter of Dec. 7, 1936, "*Ctenothripella* was never described as a genus but was mentioned in letters by myself as a subgenus and during my work on my monograph it was recognized by me as a synonym of Bagnall's *Microcephalothrips* which I then did not consider as a genus."

[2]Priesner states in above correspondence, "This is not identical with *Stylothrips* Bondar, nec Karny, Correio Agr. Bahia, 2, p. 46, 1924, (=*Retithrips* March)."

[3]The writer has not seen this reference.

from 5 to 7. The following variations however have been observed.

5 in 4 cases
6 in 35 cases
7 in 30 cases
8 in 3 cases

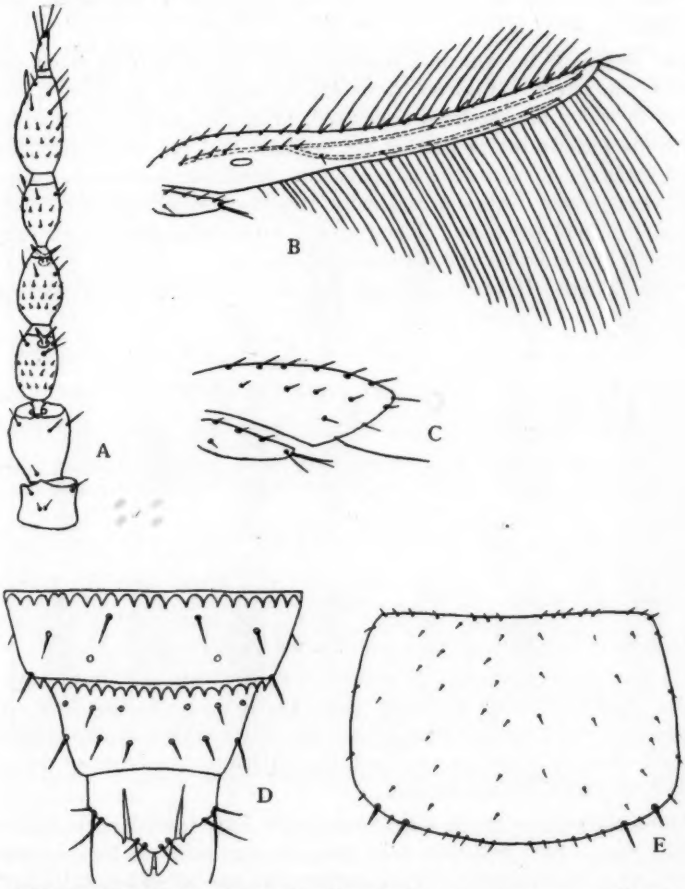

Fig 1. *Microcephalothrips abdominalis* (Crawford). A. Antenna of female; B. A typical right fore wing; C. Right wings of brachypterous male; D. Terminal abdominal segments of male. E. Prothorax.

The arrangement of bristles on the longitudinal wing veins as given by various authors is as follows:

	Fore vein	*Hind vein*
Thrips abdominalis Crawford	3—3—1—2	7
Thrips femoralis Jones	5—2—1—3	6
Thrips microcephalus Pr.	4—3—0—2	6
Thrips gillettei Moulton	4—(3—5)—3	7—8
Stylothrips brevipalpis Karny	(4—5) + (3—4) + (3—4)	7
Paraphysopus burnsi Girault	7 (4+3)—+3	6

Two other characters also are subject to some variation: namely, the number of bristles on the posterior margin of the prothorax and the length of the antennal segments. In *M. abdominalis,* between the inner one of the two larger bristles found at both the posterior-lateral angles of the prothorax, there is a row of smaller bristles (see fig. 1, E). The number of these smaller bristles on the posterior margin varies from 4 to 8 on each side of the center, the most common number being 6.

The length of the antennal segments does not exhibit as much variation as do other characters. However, the angles at which the specimen is mounted, the degree to which the specimen is relaxed, failure of authors to state whether measurements include the pedicel of the segment and the intersegmental membrane and variations in microscopical equipment, result in considerable confusion in published descriptions. Also, occasionally individual specimens are found with aborted or abnormal antennae. The available information on this character has been compiled by the writer and is presented below.

Variation in Length of Antennal Segments of *M. abdominalis* (Crawford) (in millimeters)

	I	II	III	IV	V	VI	VII	Length Total
Thrips abdominalis Crawford	0.019	0.024	0.026	0.027	0.020	0.037	0.018	0.171
Thrips abdominalis Crawford Avg. of 7 specimens on type slide (S.F.B.)	0.015	0.023	0.028	0.022	0.020	0.034	0.015	0.157
Thrips femoralis Jones	0.021	0.030	0.036	0.036	0.027	0.045	0.021	0.216
Thrips microcephalus Pr.	0.022	0.027	0.030	0.027	0.023	0.038	0.016	0.183
Thrips (*Ctenothripella* Pr.) *gillettei* Moulton	0.015	0.030	0.036	0.030	0.027	0.042	0.018	0.198
Stylothrips brevipalpis Karny	0.01	0.025	0.03	0.026	0.021	0.038	0.017	0.167
Avg. of 50 antennae from long series of S.F.B.	0.015	0.022	0.028	0.024	0.020	0.035	0.015	0.159
Extreme range (S.F.B.)	0.011-0.018	0.018-0.027	0.023-0.032	0.022-0.030	0.017-0.027	0.032-0.044	0.013-0.017	0.136-0.195

Note: Measurements by the writer do not include the intersegmental membrane.

The amount and density of the pigment on the body and appendages varies somewhat. Newly emerged adults are pale grayish-or brownish-yellow in color. Older specimens are usually a uniform brown. Thus with only one specimen, or a very short series of specimens at hand, the difficulties confronting the taxonomic worker can readily be appreciated.

Both macropterous and brachypterous males have been described (Moulton, 1929, and Karny, 1926) and have been taken by the writer at Davis, California. Both forms have been observed in copulation with the winged females in flower heads.

This thrips has a rather wide distribution including the following states in North America; California, Colorado, Florida, Georgia, Illinois, Kansas, Maryland, Oklahoma, South Carolina, Texas, Virginia, and Washington. The exotic records are from Africa, Australia, Cuba, China, Egypt, Fiji and Hawaiian Islands, India, Japan, Java[4], Mexico, Palestine[4], and Sumatra[4].

[4]The following unpublished records are made available by Dr. Priesner:
"Java: Batavia, 22. VIII. 20, in flowers of *Derris uliginosa* (Roxb.) Bth., Coll. Karny.—Pangrango, 3000 M., 1923, No. 58, Coll. Karny.
Sumatra: Prapat, Lake Toba, 4.5.1922, on *Tagetes* sp. (ornamental), very numerous, coll. L. Fulmek.—Prapat, Lake Toba, 4.6.1922, on *Rudbeckia lacinata,* very numerous, coll. L. Fulmek.

The hosts from which M. abodminalis has been taken include *Allium*, aster, *Argeratum conyzoides, Calendula, Chrysanthemum, Cosmos bispinosus, C. bipinnatus, Crocus sativus, Cucumis sativus,* dahlia, *Daucus, Dimorphotheca,* gladiolus, goldenrod, *Helenium, Heracleum, Helinathus annus, Hymenopappus carolinense, lantana, Luffa cylindrica,* marigold, *Melilotus officinalos,* pecan, *Rudbecka, Saxifraga, Senecio, Sideranthus spinolusus, Solanum,* squaw weed, *Targetes erecta,* tobacco, *Tridax procumbens, Verbesina enceliodes,* and *Zinnia elegans.*

During the late summer and fall the composite thrips is very common at Davis and Sacramento, California, in zinnia, marigold, and calendula flowers. It has been observed to be injurious to flower seeds (fig. 2), particularly those

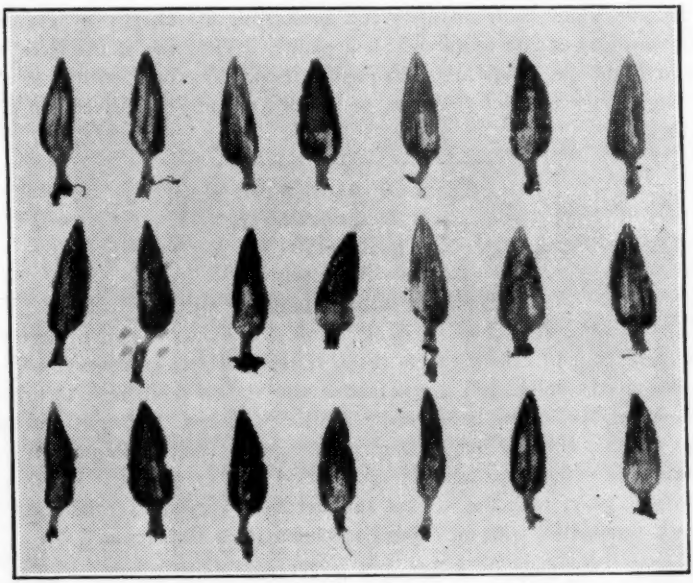

Fig. 2.—Injury to zinnia flower seeds by the composite thrips, *Microcephalothrips abdominalis* (Crawford).

with a thin coat. The writer, engaged in a study of the thrips of California became interested in this species because of its potentiality as a pest and shortly found that nothing was known of its life history.

The entire life cycle is passed in the flower heads. In this respect the habits are at variance with many of the Thripidae of which the life history is known. The eggs are inserted in the more tender portions of the flower parts, stems, and buds. The length of the egg stage was not definitely determined but is probably in the neighborhood of five days. During the early fall the larval stage extends over a period of two weeks. The prepupal stage lasted one to two days and the so-called pupal stage two to three days. The pupae are found un-

—Medan, Geon. Mariah, 600 m., 12.7.1925, on *Tithonia tagetifolia* Bt., coll. Fulmek.—Soengei-Bahasa, East Coast, 20.IX.1922, on composite with white flowers, coll. Fulmek, No. 13.—Bindjej Estate, East Coast, 17.2.1922, on the tassels of flowering maize-cobs, dead, coll. Fulmek."

protected in the flower heads only, in company with all other stages.

In gardens where all the flowers are not completely winter-killed, adults and larvae have been found all winter. Pupae have been observed up to November 25. In central California there appears to be one prolonged generation during the late fall, winter, and early spring. There is a great overlapping of generations all summer and all stages are present from April to November. The greatest seasonal abundance is reached in early fall and at this time the males become quite common. However, Moulton (1929) records a collection of males in March.

This species does not appear to be as prolific or as active as one of its most common associates, *Frankliniella occidentalis* (Perg.). The injury occasioned by *M. abdominalis* is not serious or widespread. As the host plant withers and the seeds become tough with maturity the adults migrate chiefly by crawling and hopping to adjacent and more succulent plants. While the adults have been observed in flight the wings are infrequently used. The only enemy noted is the pirate bug, *Orius tristicolor* White, which preys quite extensively on the composite thrips.

BEES OF ALBERTA. V.

BY T. D. A. COCKERELL,

Boulder, Colo.

(continued from page 114)

Hylaeus albertensis n. sp.

Male (type) resembles *H. ziziae* (Rob.), to which it runs in my table and that of Metz (but in Lovell's table to *modestus*), differing however as follows: lateral face marks obliquely truncate above, the highest point next to orbit; flagellum considerably longer, pale dusky reddish (instead of bright ferruginous) beneath; tegulae entirely black; base of wings not pale; thorax more robust, light marks on collar separated by an interval greater than the length of one; wings larger, grey, with the stigma and nervures very dark; abdomen shining pure black (compared with an Illinois specimen from Robertson.).

Female resembles *H. ziziae*, but larger and more robust; tegulae black; base of wings not pale. The lateral face-marks are long-triangular, lemon yellow. Prothorax with two transverse yellow marks on collar and yellow tubercles.

Edmonton; type male June 24 (Strickland); female July 12 (Strickland). The holotype is No. 4171 in the Canadian National Collection.

This does not agree with any species figured by Metz; it seems to be a melanic relative of *H. ziziae* (Robertson). The lateral facemarks resemble those of *H. giffardiellus* Ckll., but that is larger, with a deep orange face. They also resemble those of *H. stevensi* Crawf., but the face is yellow instead of white, the supraclypeal mark is shorter, and the scape is thick and entirely black. These remarks all apply to the male.

Hylaeus modestus citrinifrons (Cockerell). Males with the collar all black, but tubercles with a light spot; upper end of lateral marks narrow but obtuse, not obliquely truncate. Edmonton, May 28 and June 16 (Strickland); Wabamun, July 9 (Strickland); Gull Lake, June 26 (Strickland); Beaverlodge, July 6 (Peck).

I am surprised to find that a series of females, which can only belong here, shows, in every case, light marks on the collar; the lateral face-marks are narrow, not triangular; tubercles light. These would go to typical *modestus* Say in the tables. They are from Edmonton, July 20 (Strickland); Wabamun, June 27 (Strickland); Gull Lake, June 28 (Strickland); Beaverlodge, June 21 (Peck); Bilby, July 4 (Bryant); Frank, Aug. 15 (Strickland).

Hylaeus cressoni (Cockerell). Variable males as follows:

Scape with a light mark.

(Tubercles with a light mark. Illinois and Nebraska specimens.)

Tubercles entirely black. Beaverlodge, June 14 (Peck).

Scape all black.

Tubercles with a light mark. Gull Lake, July 27 (Strickland).

Tubercles with minute pale dot. Beaverlodge, June 21 (Strickland).

Thus they tend to be melanic, but are too variable to define a race.

Hylaeus basalis (Smith). Females. Bilby, Aug. 10 (Bryant); Nordegg, July 30 (Strickland).

Males. Gull Lake, June 8 (Strickland); Fawcett, June 20 (Strickland); Wabamun, July 1 (Strickland).

Hylaeus ellipticus Kirby (*varifrons* Cresson). Males, abundant at Beaverlodge, Edmonton and Wabamun (Strickland); Gull Lake, June 8 and 25 (Strickland).

Females. Beaverlodge, June (Strickland, Peck); Fawcett, June 20 (Strickland); Wabamun, June (Strickland); Nordegg, July 27 (Strickland); Gull Lake, June 23 (Strickland). These females have a transverse band, or at least a pair of spots, on the lower margin of the clypeus; but a series from Nordegg, July 25 (Strickland), Wabamun, June 27 (Strickland) and Beaverlodge, June 16 and 21 (Strickland) shows the collar, tegulae and clypeus dark.

Considering the Alberta *Hylaeus* as a whole, it may be said that they show a marked tendency towards melanism.

DESCRIPTIONS OF NEW GENERA (LEPIDOPTERA, NOCTUIDAE, CUCULLIINAE).

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In the course of revising the subfamily Cuculliinae of the Noctuidae, it has become obvious that many of the species have been placed in genera where they do not belong, and others have been merely 'dumped' into the most convenient genus; it is to rectify the above conditions that the following genera are described.

Anathix gen. nov.

Proboscis well developed; palpi short, porrect, not exceeding the front, clothed with scales and short hair; eyes moderate and round; antennal scape without lashes, antennae of male minutely ciliate; thorax clothed with hair-like scales, anterior crest small and usually not very evident, no posterior tuft; abdomen somewhat flattened, clothed with rough scales and hair, no tufts present; forewing with the costa curved, apex acute.

Male genitalia symmetrical; uncus bifid to base; tegumen broad; vinculum

moderate; harpes simple, corona weak, clasper simple and curved; aedoeagus moderate in length, heavy, vesica with a multiple row of weak spines.

Genotype: *Xanthia puta* Grote & Robinson=*Anathix puta* (G. & R.).

This genus of four very closely related species may be readily distinguished from *Xanthia* Hbn., which is its closest relative, by its shorter palpi and smaller anterior thoracic tuft, the latter is very conspicuous in *Xanthia*. The genitalia of the two genera differ in the following respects, the corona on the harpe of *Xanthia* is much stronger and composed of more spines, the clasper of *Xanthia* is straight while that of *Anathix* is curved, and the vesica of the aedoeagus of *Xanthia* has but a single broad spine as against the row in *Anathix*.

Lycanades gen. nov.

Proboscis well developed; palpi porrect, moderately long, exceeding the front, clothed and fringed with hair; eyes moderate and round: antennal scape without lashes, antennae of male minutely ciliate, arising from beneath a tuft; thorax clothed with hair, with a distinct anterior crest, triangular in shape, posterior tuft absent; tibia of all legs clothed with close appressed scales and a few hairs; abdomen clothed with rough scales and hair, no tufts present; forewing with the costa straight, the apex acute.

Male genitalia symmetrical; uncus simple, short and broad; tegumen broad; vinculum moderate; harpes with a pollex, corona absent or but poorly developed, clasper long and curved; aedoeagus moderately long and stout, vesica with numerous well developed spines.

Genotype: *Xanthia pulchella* Smith=*Lycanades pulchella* (Sm.).

This genus contains two species which may be distinguished from members of the genus *Rusina* Steph. by their simple antennae, those of *Rusina* being fasciculate and by their well developed anterior thoracic tuft, that of *Rusina* being small and poorly developed. The differences between the two genera are quite marked in the genitalia, the uncus of *Rusina* is long and narrow, that of *Lycanades* is short and broad; the harpes of *Rusina* are simple, those of *Lycanades* have a well developed pollex; the clasper of *Rusina* is bent twice at right angles with itself and possesses a roughened spinose area on its dorsal side, that of *Lycanades* is simple and curved, the vesica of the aedoeagus of *Rusina* has in addition to the numerous well developed spines characteristic of *Lycanades* a large 'rose thorn' spine.

Xystopeplus gen. nov.

Proboscis fully developed; palpi rather long, first and second segments oblique, third segment porrect forming with the frontal tuft an acute angle, fringed with hair below; eyes large and round; antennal scape without lashes; antennae of male fasciculate; thorax clothed with hair and hair-like scales, anterior tuft ridge-like and very prominent, posterior tuft indistinct; tibia of all legs with close appressed scales, fringed on the outer side with short hair; abdomen distinctly flattened, with lateral tufts, clothed on the dorsum with scales mingled with a few hairs; forewing with the costa straight, the apex slightly produced and acute, margin straight, oblique at inner angle.

Male genitalia symmetrical; uncus simple, moderately long and curved; tegumen broad with two rather well developed basal lobes; vinculum moderate; harpes

ending in a simple long heavy spine, which probably represents the pollex of other members of this group, clasper very long and recurved; aedoeagus moderately long and stout, vesica with a cluster of very long spines.

Genotype: *Jodia rufago* Hubner=*Xystopeplus rufago* (Hbn.).

It is unfortunate that the genus *Jodia* cannot be used for the North American species *rufago,* because the European species *croceago* Schiff. was designated as the type of *Jodia* by several workers prior to Hampson's designation of *rufago* as type, which must necessarily fall, and in as much as the two species are not congeneric, it has left *rufago* without a generic name.

The genus *Xystopeplus* may be distinguished from its near relative *Jodia* by its shorter palpi, larger and rounder eyes, and more pointed apices of the primaries. The genitalia of the two genera differ primarily in the shape of the end of the harpe, that of *Jodia* being bifid at the tip and possessing an evanescent corona while that of *Xystopeplus* ends in a long spine, and the vesica of *Jodia* lacking the long spines of *Xystopeplus.*

Metaxaglaea gen. nov.

Proboscis fully developed; palpi porrect, fringed with long hair below, last segment drooping; eyes large and round; antennal scape without lashes; antennae of male minutely ciliate; thorax clothed with hair, without an anterior tuft and with an indistinct posterior tuft; tibia of all legs with short appressed scales and fringed with hair, spines on the first segment of the fore tarsus strong; abdomen somewhat flattened, with lateral tufts, clothed on the dorsum with rough hair; forewing with apex acute, margin crenulate.

Male genitalia symmetrical; uncus simple, long and curved; tegumen broad with two expanded basal lobes; vinculum moderate; harpes with pollex and well developed corona, clasper not present in the genotype, but present in *M. signata* Frch., which is to the writer's way of thinking the most primitive member of this genus; the aedoeagus moderately long, vesica with a single 'rose thorn' spine.

Genotype: *Orthosia viatica* Grote=*Metaxaglaea viatica* (Grt.).

This genus may be easily separated from its close relatives by the absence of the prominent anterior thoracic tuft so characteristic of the genera *Eupsilia, Epiglaea,* and *Harpaglaea,* and also from the last named genus and *Psectraglaea* by the smaller claw-like spines on the first segment of the fore tarsus.

Pyreferra gen. nov.

Proboscis fully developed; palpi porrect, fringed with very long hair below, last segment small, obscure; eyes round; antennal scape with long distinct lashes; antennae of male ciliate; thorax clothed with hair, with a very distinct anterior, triangular, knife-edge crest and an indistinct posterior tuft; tibia of the first two pair of legs fringed with long hair, tibia of the last pair of legs with short hair; abdomen flattened, with lateral tufts, clothed on the dorsum with rough hair and scales; forewing with the apex blunt, the margin crenulate.

Male genitalia tending to be asymmetrical, either in the size and shape of the sacculi or the end of the harpes, or both; the uncus moderate in length with a dorsal carina; tegumen broad, with two small expanded ventral lobes; vinculum narrow; the harpes irregular, clasper simple but irregular, curved; aedoeagus short and stout, vesica without cornuti or spines.

Genotype: *Scopelosoma pettiti* Grote=*Pyreferra pettiti* (Grt.).

The possession of lashes on the antennal scape of the four species of this genus makes it unique in this group (Glaeini), and this character will serve to distinguish it from the remaning genera of the group.

Lomilysis gen. nov.

Proboscis rather well developed and functional; palpi short and porrect, fringed below with hair; eyes moderate and round, antennal scape with a cluster of scale-like lashes; antennae of male subserrate; head with a distinct frontal tuft between the eyes and below the antenna which arise from below another tuft; thorax clothed with fine scales, both anterior and posterior tufts absent; tibia of all legs fringed with hair; the fore tibia terminating in a distinct claw, which is approximately one-third as long as the first joint of the fore tarsus; abdomen clothed with scales and hair on the dorsum, no tufts present; forewing narrow, the costa curved, the apex rounded.

Male genitalia symmetrical; the uncus short and broad, spatulate in shape; tegumen moderate, vinculum moderate; harpes with pollex, corona weak, clasper short and curved; aedoeagus moderately long and stout, with a row of saw like teeth at its apical extremity, vesica without cornuti or spines.

Genotype: *Cleoceris discolor* Smith=*Lomilysis discolor* (Sm.).

This monotypic genus belongs in the group of genera characterized by *Brachylomia*, *Hillia*, and *Litholomia*, it may be easily distinguished from any genus in the group by the presence of the tibial claw; its genitalia are typical of the group to which it belongs.

Miracavira gen. nov.

Proboscis not strongly developed, but functional; palpi very small, porrect clothed with fine appressed hair, the second segment triangular and the third segment exceedingly small; eyes very large and round, without evident lashes; antennal scape with a dense tuft of lashes; antenna of male pectinate; thorax clothed with very fine hair and with no evident tufts; tibia of all legs densely fringed with long hair; abdomen clothed with rough hair and some scales, with a distinct tuft on the first dorsal segment; forewing broad, the apex rounded.

Male genitalia symmetrical; uncus short and broad; tegumen broad with two large lobes situated on either side of the uncus; vinculum narrow; harpes simple, corona evanescent, clasper large, prominent, highly chitinized, curved and ending in numerous rough points, situated beyond middle of harpe towards tip; aedoeagus short and stout, vesica with numerous small cornuti and very large long spines.

Genotype: *Momaphana sylvia* Dyar=*Miracavira sylvia* (Dyar).

The species included in this genus number three and are all very closely related; they may be distinguished from the members of the genus *Feralia* Grt. (*Momaphana* Grt.) with which they have placed, by the evident lack of lashes, which would place this genus in the Acronyctinae, in the vicinity of *Canna* Wlk. and *Daseochaeta* Warren, by their very small palpi and very large eyes, and by their semi-hyaline secondaries. The genitalia of the two genera differ so radically, as to afford no points for comparison.

THE GENUS SMICROPLECTRUS IN CANADA (HYMEN.: ICHNEUMONIDAE)*.

BY G. STUART WALLEY,
Ottawa, Ont.

Except for one species described by Cresson as *Cteniscus californicus*, but apparently referable to this genus, all the known American species occur in Canada. A study of the material contained in the National Collection has revealed several species which appear to be new. Descriptions of these are given below together with notes on the previously described species and a key is provided for the separation of all species except *californicus*. According to the original description of *californicus* it differs from the species here treated in having the mesoscutum prominently marked with two reddish longitudinal stripes.

Cteniscus albilineatus Walsh (genotype of *Anderis* Davis) has already been referred to *Smicroplectrus* by Roman (Ent. Tidsk., p. 128, 1913) when he places *Anderis* as a synonym of *Smicroplectrus*.

The genus *Excavarus* Davis, through its genotype *annulipes* Cress. is here considered synonymous with *Smicroplectrus*.

Microplectron alaskensis Ashm. described from Popoff Isl., Alaska, should be referred to the genus *Eridolius* according to notes which I made when I examined the type in 1934. Mr. R. A. Cushman (in litt.) has also confirmed this.

KEY TO SPECIES

1. Hind tibia entirely without apical spurs ..... 2.
   Hind tibia with a single very small apical spur ..... 3.
2. Tarsal claws with 5 or 6 strong teeth extending to apical third of claw; mesoternum, mesopleura below and metapleura reddish; hind femora usually reddish (more rarely rufopiceous) with base and apex blackish; hind tibia with a broad median whitish band ..... *annulipes* (Cress.).
   Tarsal claws with 3 or 4 minute teeth on basal third of claw; mesosternum, mesopleura and metapleura black; hind femora black; hind tibia of female black, in some males with a dirty yellowish median band ..... *velox* n. sp.
3. Propodeum incompletely areolated, lateral longitudinal carinae absent, median longitudinal carinae weak, costulae absent, apical transverse carina strong especially laterally ..... 4.
   Propodeum with lateral longitudinal carinae present, median longitudinal carinae strong, costulae usually distinct, apical transverse carina moderately strong ..... 5.
4. Hind coxae reddish; hind femora reddish with base and apex dusky; face white without a median black stripe ..... (♂ near *incompletus*).
   Hind coxae black, ornamented with white; hind femora black; male with a broad median black facial stripe extending to clypeal suture *incompletus* n. sp.
5. Hind tarsi distinctly incrassate; female antennae 29-35 segmented ..... 6.
   Hind tarsi normal; female antennae 23-26 segmented, male 24-26 segmented, smaller species ..... 7.
6. Length 10-11 mm.; hind coxae entirely red; hind femora red with base and apex narrowly blackish; antennae of female 35 segmented .. *robustus* n. sp.
   Length 6-8.5 mm.; hind coxae always partly black, often variegated with red

*Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa.

and white; hind femora black, sometimes rufopiceous on inner surface; antennae of female 29-31 segmented ..... *apicatus* (Prov.).

7. Hind coxae reddish in female ..... *disseptus* Wly.
Hind coxae bicolored, black and white in female ..... *albilineatus* (Wlsh.).

Smicroplectrus annulipes (Cress.)

Cteniscus annulipes Cresson, Trans. Am. Ent. Soc. II, 112, 1868.
Excavarus annulipes Davis, Trans. Am. Ent. Soc., XXIV, 233, 1897.
Excavarus annulipes Viereck, U. S. N. M. Bul. 83, 58, 1914 (designated genotype).

Davis (*op. cit.*) erected the genus *Excavarus* for *annulipes* and *Cteniscus vitticollis* Cress. and Viereck subsequently designated *annulipes* genotype. The writer has recently examined the type of *vitticollis* and would refer it to the genus *Diaborus*.

The principal character selected by Davis to distinguish *Excavarus* from its allies, viz. "the scutellum deeply and broadly excavated above" is not altogether a stable one and may be more or less due to distortion. A weakness in the scutellar integument especially in slightly immature specimens would easily account for such a condition. Moreover it has been noted that the same condition prevails in several species of *Smicroplectrus* and also in the genus *Diaborus*. *Annulipes* in other respects presents so many features in common with *Smicroplectrus* that the writer can see no good reason for regarding them other than as one genus. The present species appears to be most closely allied to *velox* n. sp. and in common with it differs from the remainder of the species here treated in having the hind tibia entirely devoid of calcaria. Such a character is not deemed to be of generic or even subgeneric importance but for those who regard it so the name *Excavarus* would apply to these two species.

Davis and Cresson record *annulipes* from Mass. and Ill. The writer has seen examples from Que., Ont. and Alta., Canada.

Smicroplectrus velox n. sp.

Female.—Length 7.5 mm. Head large, broader than thorax; postocellar line slightly greater than diameter of lateral ocellus, the latter a little more than half ocellocular line; eyes distinctly diverging below; face at lower extremity of eye distinctly broader than height of eye; front finely sparsely punctate, polished and impunctate just above antennae; hypostomal carina high between base of mandible and point where it is joined by occipital carina; cheeks and temples shining, very sparsely, finely punctate; antennae 30-segmented, first flagellar as long as second and third combined. Thorax shining, rather finely punctate except mesopleura above; notauli defined in front; propodeum completely areolate, carinae strong, areola slightly longer than wide, petiolarea with a median longitudinal carina, all areas shining, impunctate, irregularly rugulose; radius arising a little before middle of stigma, nervulus slightly post-furcal, nervellus inclivous; legs moderately slender, hind tarsi not thickened, hind tibia entirely without calcaria, all tarsal claws with only 3 or 4 minute teeth at base. Abdomen rather broad, first tergite with two strong, median, parallel, longitudinal carinae, surface shining, impunctate, feebly rugulose and somewhat transversely so between carinae; second tergite with two oblique impressions on basal half, surface shining with distinct longitudinal rugulae which are stronger at base and become indistinct at apical third, the region beyond moderately punctate; remainder of tergites shining, finely, moderately punctate.

Black; head black with face, clypeus, inner orbits not quite to top of eye, mandibles except teeth, malar space and part of cheeks, ivory white; clypeal foveae and suture stained with blackish; antennae black at base with apical half or more of flagellum pale brownish below and darker brown above; thorax and abdomen black marked with ivory white as follows: propleura except lateral margin, anterior margin of pronotum, tegula, spot below, line along epicnemia, spot above, narrow posterior margin of mesopleura beyond fossae, apices of scutellums, median apical spot on first tergite and apical margins of following tergites, the posterior tergites more broadly banded than anterior; explanate margin of mesoscutum above tegula and base of front wing whitish-hyaline; legs reddish except as follows: entire front coxae, middle coxae in front, creamy white tinged with reddish; hind basal trochanters blackish; hind femora black with extreme apex somewhat yellowish, hind tibia black, somewhat brownish at middle with extreme base whitish; three apical segments of middle tarsus and entire hind tarsi except whitish base of first segment of latter, black; wings very faintly smoky, veins and stigma dark brown the latter with a whitish spot at base.

Male.—Length 9 mm. Structurally very similar to female. Color as follows: Black; flagellum black at base shading to dark brown apically, anterior orbits as far above as upper margin of antennal foramen, whitish; clypeus whitish; face except broad orbits, black with a pair of subconfluent median whitish spots; mandibles except teeth and small spot at base, whitish; malar space whitish, joined to orbits; palpi pale reddish-brown; thorax black with whitish as follows: short line on anterior margin of pronotum, tegulae, spot below, spot on upper posterior angle of mesopleura and apices of scutellums; abdomen as in female except apical tergites, especially the seventh, more narrowly banded with white; front and middle legs reddish, the coxae paler in front; hind legs black, the tibia with a narrow basal whitish annulus and a broad median dirty yellowish band, hind basitarsus narrowly whitish at base.

Holotype.— ♀, Bell's Corners (Carleton Co.) Ont., June 24, 1935 (G. S. Walley); No. 4203 in the Canadian National Collection, Ottawa, Ont.

Allotype.— ♂, same locality and collector, June 25, 1935.

Paratypes.—10 ♂ ♂, Bell's Corners, June 24, 25, July 2, 1935 (G. S. Walley;) 2 ♂ ♂, Wright, Que., May 26, 29, 1933 (G. S. Walley); ♂, Wright, Que., June 13, 1935 (F. A. Urquhart); ♀, Bell's Corners, Ont., June 24, 1935 (E. G. Lester); ♀, Aylmer, Que., July 2, 1935 (G. S. Walley).

Host.—In addition to the above types there has recently come to hand a single female from McLeod Meadow, Kootenay Park, B. C., July 17, 1936 (K. G. Graham) reared from the brown-headed spruce sawfly (*"Pachynematus ochreatus"*). This specimen differs in no wise from the type and it constitutes the only host record for the species. It is noteworthy that all specimens of *velox* taken by the writer were captured in proximity to spruce trees where they were flying about the tips of the branches. The same trees bore a very light infestation of *Pachynematus* sp. larvae.

Remarks.—The two female paratypes except for size (length 5 mm. and 10 mm.) agree well with the holotype. The males range in size from 7-10 mm., the larger sizes predominating. They have been arranged in a graded series, *a-n.* Specimen *a* has the two white facial marks broadly confluent, the hind coxae

variegated with reddish and blackish and the broad pale band on the hind tibia conspicuous. As the series advances in alphabetical sequence the facial spots tend to become separate, the black predominates over reddish in the hind coxae and the hind tibial band is less pronounced. Specimen *n* represents the extreme condition in which the facial spots are so reduced as to be almost obliterated, the hind coxae pure black and the hind tibial band scarcely visible. The Allotype is specimen *h*.

This species is closely related to *annulipes* agreeing with it in lacking entirely the hind tibial calcaria, in having the propodeum completely areolate with strong carinae and the second abdominal tergite longitudinally rugose with oblique furrows from the base. Some specimens in the above series of *velox* have the scutellum impressed.

Smicroplectrus sp. (near *incompletus*)

A single male from Hull, Que., May 30, 1903 appears to represent a valid species closely allied to the following. Its position is indicated in the foregoing key but until females are obtained it has been thought best not to suggest a name.

Smicroplectrus incompletus n. sp.

Female.—Length 8.5 mm. Head large, broader than thorax; ocellocular line twice diameter of lateral ocellus; eyes only very slightly diverging below; face at lower extremity of eyes slightly broader than height of eye; front finely, rather sparsely punctate, weakly rugulose above antennae; occipital carina very weak where it joins the stronger hypostomal carina; antennae 30-segmented, first flagellar as long as second and third combined. Thorax shining, punctate; notauli distinct as far posteriorly as tegulae, somewhat foveolate in front; propodeum incompletely areolate, only the apical transverse carina distinct, basal area and areola indicated by a more or less flattened area but not defined by carina, apical transverse carina very strong especially on either side; posterior face of propodeum almost vertical, shining and feebly rugose, elsewhere the propodeum rather smooth and only minutely punctate;; radius emitted a little before middle of stigma, nervulus post-furcal by almost half its length, nervellus inclivous; legs rather slender, hind tarsi rather stout; hind tibia with a single minute calcarium, tarsal claws with 4 distinct teeth. Sides of first tergite parallel in basal third and slightly diverging beyond, apical width almost equal to length, median carinae distinct almost to apex, stronger and closer together at middle giving tergite a more or less elevated appearance at this point; surface of first and following tergites dullish, scabrous, a little more coarsely so on anterior tergites and with apices of posterior tergites smoother and minutely punctate; second tergite without oblique grooves.

Black; face except narrowly below antenna, clypeus, mandibles except tips, malar space, genae, spot below on scape, palpi, flagellar segments below, propleura, anterior margin of pronotum except at middle, tegulae, spot before, larger spot below, spot on mesopleura at end of epicnemia, apices of scutellums, front and middle coxae and trochanters except base of middle coxae, narrow apex of hind coxae, hind apical trochanters, median spot at apex of first tergite, median portion of posterior margin of second tergite narrowly, posterior margins of following tergites (more broadly on apical tergites) and spot at base of stigma,

whitish; front and middle legs beyond trochanters reddish with apical segments of middle tarsi blackish; hind legs except as noted above, black.

Male.—Differs in color from female as follows: face black with broad white orbits below antennae; genae black; no spot on mesopleura at end of epicnemia.

Holotype.—♀, Mt. Albert, Gaspe Co., Que., elevation 3500-3700 ft. July 21, 1933 (W. J. Brown); No. 4204 in the Canadian National Collection, Ottawa, Ont.

Allotype.—♂, Kentville, N. S., June 3, 1923 (R. P. Gorham).

Paratype.—♀, Cascapedia R., Gaspe Co., Que., July 13, 1933 (M. L. Prebble).

Smicroplectrus apicatus (Prov.)

Cteniscus apicatus Provancher, Pet. Faun. Ent. Can. Hymen., II, 421, 1883.

Discussion of this species is based on Provancher's type and a series of females in the National Collection. The type is a female, not a male as indicated by Provancher and subsequent authors. Davis (1897) considered *apicatus* a synonym of *albilineatus* but I have applied that name to an allied species for the reasons stated in the discussion under *albilineatus*. I have not seen males of *apicatus*. The female is described as follows.

Female.—Length 6-8.5 mm.; antennae 29-31 segmented; eyes slightly diverging below; face at lower extremity of eyes as broad as height of eye; notauli defined to middle of mesoscutum; propodeum completely areolate, carinae strong, apical transverse carina forming slight apophyses on either side, costulae sometimes not quite attaining lateral carina; posterior face of propodeum less sharply declivous than *annulipes;* hind tibia with a single small calcarium; hind tarsi incrassate, claws with 4-6 teeth; nervulus only slightly post-furcal; cubito-discoidal vein with a more or less distinct ramellus. First tergite with sides slightly diverging, nearly three-fourths as broad at apex as median length, median pair of longitudinal carinae strong; second tergite as broad at apex as length, oblique grooves weakly defined, a pair of short carinae at base; abdomen rather dullish, tergites scabrous, the first coarsely so and more shining than the others, apical tergites more finely sculptured especially on posterior margins.

Black, with whitish markings very similar to those described for *incompletus;* also with mesoscutal carina opposite wing bases conspicuously whitish, propodeal apophyses with a whitish spot, hind coxae black below, largely white above, sometimes with more or less at base; hind femora black, in some specimens rufopiceous inwardly in median portion.

Remarks.—Although actual oviposition was not observed this species is believed to attack *Pontania* sp. At Jockvale, Ont. May 28, 1934, the writer collected seven females which were observed flying about a number of *Pontania* larvae feeding on a small specimen of *Populus tremuloides.* Several of the sawfly larvae bore stalked eggs of the type found in this and allied genera so the association appears to be reasonably certain.

Smicroplectrus robustus n. sp.

Very similar to *apicatus* (Prov.) but larger, with stouter abdomen, red hind coxae and red hind femora, the latter darkened at base and apex. The hind

tarsi are incrassate as in *apicatus*. The present species differs in the following respects from the above description of *apicatus*.

Female.—Length 10.5 mm.; antennae 35-segmented; face at lower extremity of eyes slightly broader than height of eye; first tergite fully three-fourths as broad as long; second tergite one-fourth broader at apex than long. Hind legs with coxae, basal joint of trochanter and femora red, the latter blackish at base and apex.

Male.—Very similar to female, antennae 31-segmented; propodeal apophyses and hind basal trochanter black.

Holotype.—♀, Kazubazua, Que., June 12, 1935 (G. S. Walley); No. 4205 in the Canadian National Collection, Ottawa, Ont.

Allotype.—♂, Noranda, Que., June.

Paratype.—♀, Gull Lake, Alta., June 18, 1929 (E. H. Strickland).

Host—The holotype was observed ovipositing on a larva of *Nematus* sp. (*Pteronidae* of recent authors) found feeding on *Populus* sp. I am indebted to Dr. H. H. Ross for the determination of the host.

Smicroplectrus disseptus Wly.

Smicroplectrus disseptus Walley, Can. Ent., LXV, 256, 1933.

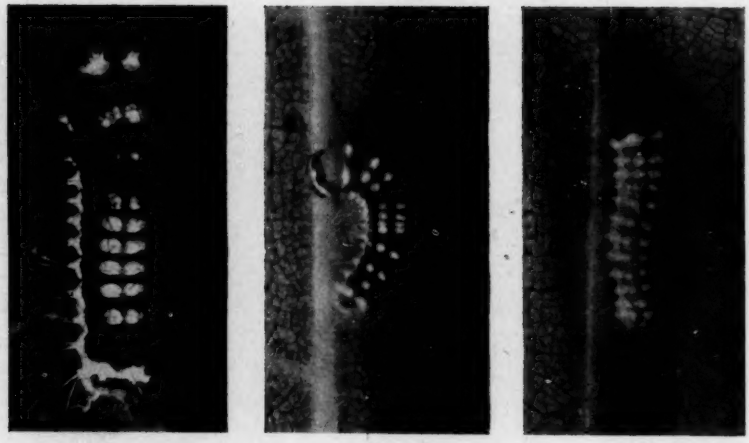
This species was originally described from specimens from British Columbia. Two females are now at hand from Jockvale, Ont., May 24, 1935 (G. S. Walley) and Knowlton, Que., July 8, 1936 (G. S.Walley). In structure they are very similar to the type but differ in color in having the pronotum largely (except the collar and anterior portion) and a conspicuous stripe on the lower mesopleura reddish.

Smicroplectrus albilineatus (Walsh)

Cteniscus albilineatus Walsh, Trans. St. Louis Acad. Sci., III, 107, 1873.

The type of this species is lost and there is practically nothing in the original description to exclude applying this name to the species here called *apicatus* Prov. However it is noteworthy that Walsh's description while rather complete fails to mention the incrassate hind tarsi which are a conspicuous feature in *apicatus*. The species to which I now apply the name *albilineatus* has the hind tarsi of normal slenderness and in all other respects answers very exactly to Walsh's description. It is known to me from two female species, one without locality label but from Harrington collection, the other from Moosonee, Ont., July 18, 1934 (G. S. Walley). The latter specimen agrees most exactly with Walsh's description even to having the antennae pale below near the middle and the hind coxae bicolored, black below and white above. It also has the costulae absent whereas in *apicatus* they are usually present.

Albilineatus as here recognised is a small slender species, generally smaller than *apicatus* judging from the material before me. In structure it resembles *disseptus* Wly. but differs in color from that species. Both specimens of *albilineatus* which I have studied have the tip of the abdomen slightly compressed as noted by Walsh, a condition not present in any specimens of *disseptus* or *apicatus* that I have seen.



1. *T. luna*, dark form (Homozygote?) Semi-dominant. 2. *T. luna*. 1st Instar, dark form (Heterozygote) 3. *T. luna*, 1st Instar, light form, recessive.

MENDELIAN 3-1 RATIO OF STRIPED LARVAE AND A MODIFYING FACTOR (LEPIDOPTERA: SATURNIIDAE).

BY HARRIET A. WICKWIRE,
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In 1935 some notes were published on the heredity of striping in 1st instar larvae of *Tropaea luna*. The majority of the material obtained up to 1936 gave a 1-1 ratio of striped and unstriped larvae when the character appeared. The exception was a whole brood of striped larvae.

The females emerged from cocoons purchased from various states and gave such results when mated with local (Central New York) males. I have never found striped larvae in a brood from pure Texas, Florida or Indiana stock. Moths from these states when mated to moths from their own, or any of these states, produced broods of unstriped larvae. When females from these states mated with local males, a 1-1 ratio of striped and unstriped larvae resulted. Apparently the striping genes were present in heterozygous condition in the local males. I have not obtained a local female.

New Jersey material up to 1936 gave similar results to that from Texas, Florida and Indiana; but the Summer's experience led to the belief that the striping genes were present in New Jersey stock.

On June 7, 1936, two New Jersey *Tropaea luna* females were tied out; the next morning both moths were found in copulation with local males. These moths became N. J. female 6 and N. J. female 7 in our notes and the males—local male 5 and male 6 respectively.

Brood N. J. female 6 and local male 5 had the following life history:

Total eggs laid	449
" " hatched	373
Striped larvae	291
Unstriped larvae	82
Expected striped larvae for 3-1 ratio,	280.
Expected unstriped larvae	93
Discrepancy	11 or 3%

The N. J. female 6 and local male 5 brood were the offspring of heterozygotes.

Brood N. J. female 7 and local male 6:

Total eggs laid	445
" " hatched	356
Striped larvae	260
Unstriped larvae	96
Expected striped larvae	267
Expected unstriped larvae	89
Discrepancy	7 or 2%

This brood also was the result of a heterozygous mating.

As these broods hatched, differences appeared among the striped larvae; the differences were of intensity and width of striping. Two types of striped larvae became apparent. Unfortunately many larvae had died before we were aware of this difference, so counting was useless. It is probable that the true

ratio was 1-2-1, rather than 3-1; and that the striping factor was semi-dominant instead of dominant; the heterozygotes differed phenotypically from the homozygous dominants. A few of the darkest larvae were separated and one of these survived to spin a cocoon. If the moth emerges its homozygous nature will be proven by a breeding test.

A lens was necessary to distinguish the striped "homozygotes." The enlarged photographs which illustrate this paper gave a limited idea of the differences because of shadows between the segments.

Heterozygous larvae which appeared in broods with a 1-2-1 ratio had dark lateral lines extending the length of their bodies, connected on the first abdominal segment by a dark band passing behind the tubercles. A. S. Packard published a perfect representation of this type. His description differed from the plates in so many respects that it was inexplicable until 1936. Evidently he described what I believe to be the homozygous striped type and the artist painted the heterozygote. My description of the darker larvae follows: 1st segment edged black posteriorly; 2nd and 3rd thoracic and 1st abdominal segments dark; thoracic subdorsal tubercles green and small like those on the other abdominal segments; the 8th abdominal segments black with small black dorsal tubercles; wide black lateral lines run the length of the bodies; lateral tubercles green; ground color of bodies and tubercles except where noted, light yellow-green. There was an interesting similarity between the markings of these darkest *luna* larvae and those of *Actias salene*, 1st instar.

On May 25, 1935, 114 eggs of *T. luna* were purchased from a dealer in New York City. They were said to be the result of a mating between a female from Indiana cocoons and a Long Island male. Only 8 of these eggs hatched: 5 larvae were unstriped and 3 were striped with heterozygous patterns, but much paler than any I had seen.

On the night of June 26, 1936, an Indiana luna female was tied out and the next morning was found in copulation with a local male. This brood, Indiana female 12 and local male 10, had this history:

Total eggs laid	183
" " hatched	164
Striped larvae (light)	79
Unstriped larvae	85
Expected for 1-1 ratio	82
Discrepancy	3 or 2%

As the 1-1 ratio only furnishes one type of homozygote, this type, this time recessive. These striped larvae had the heterozygous pattern but were pale like those from the purchased eggs.

"Dilution factors" which dilute coloring have been studied in many animals. Possibly the two cases above represents a similar phenomenon. If the dilution factors were present in the genotypes of the Indiana females, they are not to be found in all Indiana lunas. I have bred many Indiana females and local males which did not produce pale striped larvae. If the striped form does not occur normally in Indiana, the dilution would have little chance to make itself known as it does not seem to affect the phenotype of the pure recessive form.

The brood Indiana female 12 and local male 10 survived to spin some cocoons. If the moths emerge it will be possible to experiment further with the heredity of this pale striped type. Also it may show Mendelian segregation.

From the experience of 1936, it appears that a 1-1 ratio of two striped types and the unstriped type of *T. luna* larvae is possible to attain. Dominant homozygotes are viable and differ phenotypically from heterozygotes. Striped genes are present in New Jersey stock as well as New York stock. There exists in some individuals, particularly moths from Indiana, a factor or factors serving to weaken the affect of the striping genes.

The surface of the problem has just been scratched, there is much more to be done. It is hoped that 1937 will reveal further interesting information.

A NEW NORTH AMERICAN FLY BELONGING TO THE GENUS *RIVELLIA* (OTITIDAE).

BY F. S. BLANTON,

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The specimens upon which this paper is based were received from various parts of four Western States. Those of the first lot were from South Dakota and were sent to the writer by Prof. H. C. Severin of Brookings, S. Dak. Among these was one specimen labeled "*Rivellia* sp. n.?" by the late Dr. J. M. Aldrich. Later, other specimens were received from H. E. Jaques, Iowa; C. W. Sabrosky, Kansas; Maurice James, Colorado; and one specimen from North Dakota, received from C. E. Mickel.

The writer takes this opportunity to express his appreciation to the above named for their contributions. This species is named for Prof. Severin.

It will be noted that some of the dates have been questioned. This is because the printed labels were somewhat blurred. Also, Iowa specimens are sometimes labeled according to the county, i.e., "Iowa Co. 3."

In addition to this species, several others which are apparently new are represented in the writer's collection by small series.

The primary types are deposited in the U. S. National Museum. Paratypes are distributed as listed below.

Rivellia severini n. sp.

(Fig. 1.)

The species is closely related to *Rivellia micans* Loew, but differs in the broader apical dark fascia in the wing pattern and the dark brown to blackish posterior tibia.

Male: Front brownish red with narrow border of white pollen on each side; vertex, ocellar triangle, and occiput dark green; first and second joints of antennae yellowish brown, the same color reaching to the apical third of the third joint inside, while the remaining distance and the outer sides are brownish black; arista brown with short pubescence; face shining reddish brown, the upper half covered with white pollen; oral margin projecting; clypeus black; palpi yellowish brown; proboscis brown. Cheeks yellowish. All bristles black, the lower frontals lacking. Hairs on front brownish black.

Thoracic dorsum bluish green, somewhat shining but dusted; pleura metallic bluish green; scutellum same as dorsum, bearing 4 bristles, the apical

pair somewhat stronger.

Legs mostly yellow, the tarsi towards their tips strongly infuscated, the four posterior coxae and trochanters slightly infuscated, the posterior tibiae brown to black.

Wings hyaline with 4 brownish cross bands as figured. Entire upper basal portion brown extending into first basal cell; first band arising at terminus of auxiliary vein and reaching to and below the fourth vein into the discal cell; second band covering the apex of the first vein, the small cross vein, and reaching the fifth vein; the third band, which is connected at its upper margin with the fourth, covering the posterior cross vein and also reaching the fifth vein; the apical band very broad, covering the entire apex of the wing to slightly beyond the fourth vein; veins yellowish in the hyaline portions and brownish black in the dark fasciae; first and third veins bearing bristles; squamae pale and halteres reddish.

Abdomen with orange-colored base, apical portion blue green, punctate; penis long, reddish brown.

Female: Very similar to male; only a slight trace of red at base of abdomen; apical portion slightly darker than that of the male; ovipositor sheath brownish black, ovipositor reddish.

Length of male 4 mm, of female 4.5 mm.

Type: Cat. No. 51444, U. S. National Museum.

Remarks: Described from 46 specimens. The holotype male is from Winner, S. Dak., July 4, 1924, "H"; the allotype female is from Iowa Co. 3, July 3, 1935? Collected by Mabel Jaques. Among the paratypes are 4 males from Winner, S. Dak., including the one labelled by Dr. Aldrich as "*Rivellia*, sp. n.?" These were collected July 3, 4 and 5, 1924, "H". Three males from Elk point, S. Dak., collected June 18, 19, and 20, 1924, "H"; 1 male from Brookings, S. Dak., June 12,

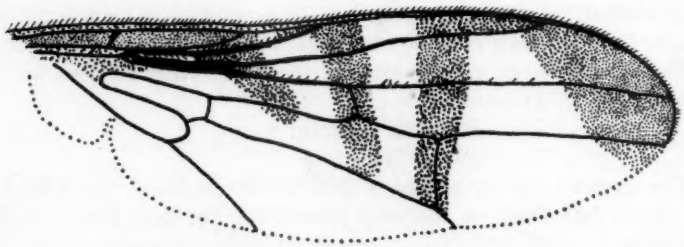

Fig. 1.—Wing of *Rivellia severini* n. sp. (x 33).

1924, "H"; 1 male from Stafford County, Kansas, June 30, 1934, salt marsh, C. W. Sabrosky, Coll; 6 males and 15 females from Iowa as follows: All from Iowa Co. 3; 1, July 2, 1934, H. E. Jaques; 15, July 3, 1935? Mabel Jaques; 5, July 3, 1935, Gould Warren; 1, July 5, 1935, L. K. Cutkomp; 7 males and 4 females from Colorado; 1, White Rocks, Valmont, Colo., July 2 and 4, 1933, M. and H. James; 10, Las Animas, Colo., July 17, 1933, acc. 5397, collected by L. H. Sweetman: 1 1923, H. C. Severin, Coll., "196"; 1 male from Springfield, S. Dak., June 18, 1930, G. Gilbertson, collector; 2 badly damaged females from Winner, S. Dak., July 3, male from Kidder County, N. Dak., July 14, 1920, A. A. Nichol.

The types are distributed as follows: The holotype male and allotype female are in the U. S. National Museum along with 2 pairs of the paratypes. The Kansas specimen is in the collection of C. W. Sabrosky; 10 specimens are in the collection of the Iowa Natural History Survey, Wesleyan College, Mt. Pleasant, Iowa. Six specimens are returned to Maurice James, 8 to H. C. Severin, and 1 pair to C. E. Mickel, University of Minnesota. The remaining specimens are in the author's collection. This includes the specimen illustrated along with the slide mount of the right wing.

Among the paratypes there is a slight amount of variation, especially in the extent of the orange color at the base of the abdomen. The 4 posterior coxae and the posterior tibiae are darker in some specimens; the Colorado series are slightly larger than the others but in all other respects are seemingly conspecific.

A CORRECTION.

BY J. McDUNNOUGH,
Ottawa, Ont.

In the Canadian Entomologist, Volume 69, p. 45, 1937, I described a new genus of Noctuidae under the name *Pseudoleucania*. Mr. P. H. Oehser of the Smithsonian Institution, United States National Museum has called my attention to the fact that this name is preoccupied by *Pseudoleucania* Staudinger (Ergeb. Hamburg Magalh. Sammelr., Volume 2, Lep. p. 73, 1898) and that my generic name, consequently, becomes a homonym. To replace this name I would propose the generic name PROTOLEUCANIA.

BOOK NOTICES.

There has recently come to my desk an interesting and valuable volume entitled, "The Biological Control of an Insect in Fiji," this being a full account of the coconut leaf-mining beetle, *Promecotheca reichei* Baly, and its parasite complex. The publication of this book has been met in part by grants from the Royal Society and the University of London. The Imperial Institute of Entomology undertook the editing and production of the work. It is a volume of 239 pages, with 17 text illustrations, 2 maps, and 23 full page plates.

The coconut leaf-mining beetle is indigenous in Fiji. It is a pest of coconut palms only. As the author states, it attacks the leaves and no other part of the tree. The direct damage is of two kinds: the adults feed externally on the undersides of the distal thirds or halves of the leaflets, causing these to die outright; the larvae feed by mining the leaflets. Both types of injury so weaken the trees as to cause extensive cessation in the production of nuts, and, therefore, in the output of copra.

Investigations looking to the biological control of this beetle commenced in 1929 and by 1934 there was definite evidence that the results had proved successful. The story of this project as told by Mr. Taylor will be read with intense interest by all entomologists, particularly so by those concerned with studies relating to the biological method of pest control.

The volume is divided into ten chapters as follows: I—Introduction; II—*Promecotheca reichei* Baly; III—Parasites and Predators associated with *P. reichei* in Fiji (prior to 1933); IV—*P. reichei* as an insect of economic import-

ance (prior to 1933); V—The nature and extent of the control exercised by the parasites and other factors (prior to 1933); VI—The search for parasites for the control of *P. reichei,* the hispids and parasites concerned, and the selection of parasites; VII—*Pleurotropis parvulus* Ferr.; VIII—The introduction into Fiji of parasites from Java and the consequent control of *P. reichei;* IX—Methods employed for breeding and studying *Promecotheca* and its parasites, and for collecting data in the field; X—References.

In the presentation of the results of this investigation, Mr. Taylor has contributed most valuable data, not only regarding the life-history of the host insect, but also of the various species of parasites which were investigated. All of this information should assist very materially future studies of a similar nature. We commend the volume to our readers. It can be obtained from the Imperial Institute of Entomology, 41 Queen's Gate, London, S. W. 7, England, at a nominal price. ARTHUR GIBSON.

Animal Communities in Temperate America as illustrated by the Chicago Region. Second Impression. By Victor E. Shelford, University of Chicago Press. 381 pages. $3.00.

In this edition typographical and clerical errors have been corrected. Although community and taxonomic nomenclature have changed greatly since the first edition in 1913, these changes have not been incorporated in the text matter. To take care of the changes in community nomenclature, a table has been added in the section "Bibliographical Index," a new feature of this edition containing some seventy references. Since many of the natural areas originally studied no longer exist as such or have been considerably modified, and since many species of earlier days have been separated into two or more, any changes in taxonomic nomenclature have been deemed inadvisable by the author. Insects play an important part in practically all land and fresh water animal communities. Owing to the attention given to the origin, development, and fate of the communities, the discussion of the animals concerned, and their interrelationships, this book has been, and still will be, of decided value to entomologists as well as ecologists.

Insect Wonders of Australia, by K. C. McKeown, of the Australian Museum. Angus and Robertson, publishers, Sydney, 252 pages, 31 illustrations. Price 6/-.

In this book, a companion volume to "Spider Wonders of Australia," the author relates in a popular style many interesting features of Australian insects. The reader's attention is intrigued by an account of the social economy of ants, their use of larval labor, other insects, and living storage vessels for food, guest insects in the colony, and the enemies of ants. A case of maternal instinct exhibited by a sawfly, the maker of cases, cocoons, and galls, light-giving insects, and the complicated social life of the termites, continue to hold one's interest. Examples of protective resemblance, the peculiar habits of some butterflies, grasshoppers and crickets, and insect courtship, as well as of some Australian bugs, add their interest to the book. The final chapter on insect foods of Australian aborigines is not without its interest. Although written in a popular style, the

quotations from naturalists and explorers add to the interest and accuracy of the book.

R. OZBURN.

NEWS and VIEWS

LYMAN ENTOMOLOGICAL COLLECTION.

The Lyman Bequest Committee held its Annual meeting on April 6th, 1937 in the Lyman Entomological Room, Redpath Museum, McGill University. Those present were: Dr. Fantham, Chairman, Dr. Arthur Gibson, Dominion Entomologist, Dr. W. H. Brittain and Geo. A. Moore, Secretary and Curator.

The Curator reported on work done during the past year, books added to the Library, the classification and rearrangements made in the Collection, and various services performed in answering inquiries regarding insects and other entomological matters.

He reported that the Library had been used extensively by students of Entomology, students of McGill University and Macdonald College, visiting Entomologists to the City and others. The Room had also been used by Dr. Fantham for a lecture and demonstration to students studying Invertebrata in the University. Students of the University, both graduate and undergraduate, had referred to the Collection to identify specimens and to study the forms included in their courses.

The Collection is referred to extensively by local Entomologists and the local Society often uses the rooms for their regular meetings. Out-of-town Entomologists, working on special studies, also visit the Room to secure records and to compare specimens with types in the Collection. Type specimens are also loaned to the Dominion Entomologist's Staff and experts for special study.

In these different ways the Collection and Library carry out the expressed wishes of the late Henry H. Lyman, who left his private Collection to McGill University with funds to keep it in order, to extend it and to keep the Library up to date.

New cabinets are added as required and the Collection has over grown the space allotted and many cabinets have to be located in other odd spots. A larger room is urgently required which the Committee hopes may become available in the near future so that the whole Collection may be concentrated in one place.

Recently the Collection was increased by donations made by local Entomologists, a large collection of Lepidoptera from the estate of the late Mr. C. Race, and a large number of South African Lepidoptera and other insects from Mr. Eugene Munroe, a student of McGill University.

The Collection and Library began in 1914 with Mr. Lyman's Collection of Lepidoptera and books. There were approximately 12,000 specimens of Butterflies and Moths, largely from North America housed in five cabinets of 30 drawers each. This has grown to 26 cabinets having 728 drawers, housing approximately 200,000 specimens of all orders of Insects.

The Library has now over 1,500 bound volumes on all orders and phases of Entomology, and receives issues of 20 current Entomological Journals.

The local press and citizens of Montreal make many inquiries regarding injurious and curious insects which are investigated by the Curator, who gives

the information desired, assists in the identification of specimens and advises regarding the control and elimination of pests.

TRAPS AND POISON SHOW SOME GAINS OVER JAPANESE BEETLE.

Gains over the Japanese beetles in St. Louis, Mo., and Indianapolis, Ind., more than balanced gains by them in Chicago, Ill., and Cleveland, Ohio, according to Lee A. Strong, Chief of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. A concentrated drive by the department, in cooperation with State and city officials of St. Louis and Indianapolis, with man power from the W. P. A., made such a dent in beetle numbers—which were as large as those in New Jersey in 1916 when the infestation was discovered—that Mr. Strong ventures the hope it may be possible to delay actual damage in these two cities for an indefinite period. There is no assurance that complete eradication will ever be any more possible in these two isolated areas than it has been in the heavily infested centers farther east, but the aggressive campaign of suppression, started at the outset of the infestation, has exterminated larvae in the soil more completely than in any other large-scale operation.

JAPANESE BEETLE QUARANTINE REGULATIONS REVISED.

A revision of the Japanese beetle quarantine regulations effective March 1, 1937, has been announced by the U. S. Department of Agriculture.

The revision adds the cities of Cleveland, Columbus, and Toledo and the entire counties of Columbiana and Mahoning, and parts of the counties of Carroll, Jefferson, and Stark, in Ohio, to the regulated area. This action is considered necessary because of the establishment of the Japanese beetle in these areas. Additional infested territory in Maine, Maryland, New York, Vermont, Virginia, and West Virginia, also is added to the previously regulated areas in these States.

Date of Mailing, Saturday, July 3rd, 1937.